

WHAT IS CLAIMED IS:

1. A bi-directional planar light circuit (PLC) transceiver device for separating optical signals at first and second wavelengths from one another, said device comprising a wavelength selective filter (WSF) configured to pass a band of signals centered at said first wavelength and to reflect a band of signals centered at said second wavelength, said WSF placed in energy coupled proximity to an external surface of said PLC, said device further comprising an internal waveguide structure adapted to direct said optical signals in said PLC.
2. A bi-directional planar light circuit (PLC) transceiver device as in claim 1 further comprising at least one signal detector to receive said optical signals.
3. A bi-directional planar light circuit (PLC) transceiver device as in claim 2 wherein said signal detector is placed in energy-coupled proximity to said WSF.
4. A bi-directional planar light circuit (PLC) transceiver device as in claim 1 wherein said WSF is placed in energy-coupled proximity to said external surface of said PLC using a deposition process.
5. A planar light circuit (PLC) transceiver device as in claim 1 wherein said internal waveguide structure has an input end and an output end said WSF placed in a proximal relationship with said input end.
6. A planar light circuit (PLC) transceiver device as in claim 1 wherein said internal waveguide structure has an input end and an output end said WSF placed in a proximal relationship with said output end.
7. A planar light circuit (PLC) transceiver device as in claim 1 wherein said internal waveguide structure comprises a bi-directional branching waveguide having input and output ports.
8. A bi-directional planar light circuit (PLC) transceiver device as in claim 1 wherein said PLC is fabricated with material having intrinsic wavelength selection absorption properties to pass signals at said first wavelength and to reflect signals at said second wavelength.
9. A planar light circuit (PLC) transceiver device as in claim 7 wherein said WSF is placed in a proximal relationship with said branching waveguide input port.
10. A planar light circuit (PLC) transceiver device as in claim 7 wherein said WSF is placed in a proximal relationship with said branching waveguide output port.
11. A bi-directional planar light circuit (PLC) transceiver device for separating optical

signals at first and second wavelengths from one another, said device comprising mirror means configured to pass signals at said first wavelength and to reflect signals at said second wavelength, said mirror means placed in energy coupled proximity to an external surface of said PLC, said device further comprising an internal waveguide structure adapted to direct said optical signals in said PLC.

12. A bi-directional planar light circuit (PLC) transceiver device as in claim 11 wherein said PLC is fabricated with material having intrinsic wavelength selection absorption properties to pass signals at said first wavelength and to reflect signals at said second wavelength.

13. A planar light circuit (PLC) transceiver device for separating optical signals at first and second wavelengths from one another, said device comprising a wavelength selective filter (WSF) configured to pass a band of signals centered at said first wavelength and to reflect a band of signals centered at said second wavelength, said WSF placed in energy coupled proximity to an external surface of said PLC, said device further comprising an internal branching waveguide structure having an input end and first and second output ends, said input end adapted to direct said first wavelength signals to a detector at said first output end and to receive signals from an external signal source at said second output end.

14. A planar light circuit (PLC) transceiver device as in claim 13 wherein said external signal source is a laser diode.

15. A planar light circuit (PLC) transceiver device as in claim 13 wherein said external signal source is a LED.

16. A planar light circuit (PLC) transceiver device as in claim 13 wherein said external signal source is directly attached to the PLC.

17. A planar light circuit (PLC) transceiver device as in claim 13 wherein said external signal source is placed in close proximity to the PLC.

18. A planar light circuit (PLC) transceiver device as in claim 13 wherein said internal branching waveguide structure includes tapered waveguides.

19. A bi-directional planar light circuit (PLC) transceiver device as in claim 11 wherein said PLC is fabricated with material having intrinsic wavelength selection absorption properties to pass signals at said first wavelength and to reflect signals at said second wavelength.

20. A planar light circuit (PLC) transceiver assembly for separating optical signals at first

and second wavelengths from one another, said assembly comprising a wavelength selective filter (WSF) configured to pass a band of signals centered at said first wavelength and to reflect a band of signals centered at said second wavelength, said WSF placed in energy coupled proximity to an external surface of said PLC, means for directing input optical signals to said WSF and an internal waveguide structure adapted to direct signals in said PLC.

21. A planar light circuit (PLC) transceiver assembly as in claim 20 wherein said means for directing input optical signals comprises an optical fiber in a V-groove structure.

22. A planar light circuit (PLC) transceiver assembly as in claim 21 wherein said V-groove structure has a polished end face cut at a forty-five degree angle.

23. A planar light circuit (PLC) transceiver assembly as in claim 21 wherein said V-groove structure is defined in a substrate, said optical fiber captured in said V-groove structure using an adhesive coating to adhere a glass cover layer over said optical fiber to said substrate.

24. A planar light circuit (PLC) transceiver assembly as in claim 21 having means for detecting signals at said second wavelength located on the surface of said V-groove structure.

25. A planar light circuit (PLC) transceiver assembly as in claim 23 wherein said substrate is glass.

26. A planar light circuit (PLC) transceiver assembly as in claim 23 wherein said substrate is silicon.

27. A planar light circuit (PLC) transceiver assembly as in claim 20 wherein said means for directing input optical signals comprises an optical fiber in a ferrule structure.

28. A planar light circuit (PLC) transceiver assembly as in claim 27 having means for detecting signals at said second wavelength located on the surface of said ferrule structure.

29. A planar light circuit (PLC) transceiver assembly as in claim 27 wherein said ferrule structure has a polished end face cut at a forty-five degree angle.

30. A planar light circuit (PLC) transceiver assembly as in claim 27 wherein said ferrule structure is made of glass.

31. A planar light circuit (PLC) transceiver assembly as in claim 27 wherein said ferrule structure is made of silicon.

32. A planar light circuit (PLC) transceiver assembly as in claim 27 wherein said ferrule structure is made of a near infrared transparent material.

33. A device for separating signals at first and second wavelengths from one another, said

device comprising a wave guide structure for transmitting said signals along an optical path between an input and an output defined at the surface of said structure, said device including a wavelength selective filter on the surface of said structure in said optical path for separating out one of said first and second wavelengths.

34. A device as in claim 33 wherein said wavelength selective filter transmits said first wavelength and reflects said second wavelength.

35. A device as in claim 33 wherein said wavelength selective filter is positioned in said optical path on the surface of said structure at said output.

36. A device as in claim 33 also including a second output, said structure including first and second wave guides for defining first and second light paths from said input to said first and second outputs respectively.

37. A device including a folded path optical structure having first and second edges, said structure comprising first and second optical waveguides, said structure including a wavelength selective filter at said first edge, said waveguides having first and second ends said first ends communicating with said filter for directing light in said first waveguide into said second waveguide.

38. A device as in claim 37 wherein said waveguides are adapted to direct light at close to a normal incidence angle to said wavelength selective filter.

39. A device as in claim 37 including a light signal source communicating with the second end of said second waveguide.

40. A device as in claim 37 also including an optical fiber signal input means communicating with the second end of said first waveguide.

41. A planar light circuit (PLC) transceiver device for separating optical signals at first and second wavelengths from one another, said device comprising a wavelength selective filter (WSF) configured to pass a band of signals centered at said first wavelength and to reflect a band of signals centered at said second wavelength, said WSF placed in energy coupled proximity to an external surface of said PLC, said device further comprising an internal branching waveguide structure having an input end and first and second output ends, said input end adapted to direct said first wavelength signal to a detector at said first output end and to receive signals from an external signal source at said second output end whereby the detector at said first output end

detects a clear first wavelength signal with high extinction wavelength isolation from the second wavelength signal.